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DOCUMENT-IDENTIFIER: US 6236004 B1
TITLE: Steering column assembly

Brief Summary Text (24):
In the case of mechanical transmission of the switch signal, a preferred embodiment consists of the control means being configured as an axially-movable pin. By means of such pins, a swivelling motion can easily be converted into a purely axially directed movement. This makes it possible, while maintaining a compact design, to select a spatial allocation of a swivelably retained control and a switch element in which the switch element is positioned in a plane normally arranged to the swivelling axis of the control. With a control operated by rotation along its longitudinal axis, respective spatial allocation of the component can be attained in that the control means is a rotatably-held cam.

Brief Summary Text (41):
Finally, a further design possibility in the sense of the invention consists of the support board accommodating a receiver device for an HF radio remote control. The area behind the steering wheel is eminently suitable for this because in this location, due to the size of the window areas, HF radiation can penetrate favorably and largely without any disturbance. Thus it is not necessary to provide another place for the HF receiver in the region of the control panel.

Detailed Description Text (3):
On the locating device 2, a first radially-aligned receptacle 4 is provided for a first steering column switch 3. In the region of a lateral surface of receptacle 4, in a flexible tongue 5, shaped to a lateral margin of receptacle 4, there are two click-lock apertures 6, 7. Axial-symmetrically to the longitudinal axis L of the locating device 2, there is a second receptacle 8 for a second steering column lever 9. Corresponding to receptacle 4, receptacle 8 in the region of its lateral surface comprises a flexible tongue 18 into which click-lock apertures 10, 11 have been formed.

Detailed Description Text (4):
In order to attach a U-shaped support board 12 configured as an electronics printed circuit board to the locating device 2, a slot-receptacle 13 is provided. To this effect, the support board 12 is placed in a positive-locking way into a housing comprising two housing halves 14, 15, the U-shape of which corresponds to the U-shape of the support board 12. Subsequently, the support board 12 is inserted with the surrounding housing 14, 15 from radial direction into the slot receptacle 13. In the condition inserted into the slot receptacle 13 of the locating device 2, the support board 12 is positioned into the housing halves 14, 15 surrounding it, in a plane normally positioned along the longitudinal axis L of the locating device 2.

Detailed Description Text (9):
As is depicted in FIG. 5, one control lever 27 each is swivellably retained on a swivel axis 26. The swivel axis 26 is arranged in the region of the wall 28 which, if the housing 22 or 23 is inserted into the receptacle 4 or 8, is facing outward. The wall 28 comprises a window through which the respective control lever 27 leads out of the housing 22, 23. The control lever 27 comprises an extension 29 protruding into the respective housing 22, 23.

Detailed Description Text (10):

At the tip of the extension 29 a wheel 30 is hinged in such a way that its turning axis is normally aligned to the longitudinal axis of the respective control lever 27. In this, the wheel 30 movably arranged in longitudinal direction of the control lever 27 and by means of the force of an elastic element (not shown), is pushed towards an arc-shaped marginal section 32 comprising three click stops 31 spaced apart in regular angular spacing, of a recess 34 in a closed lateral wall 33 of the housing 22, 23. The click stops 31 define three switch positions for the respective control lever 27 of the steering column switches 3, 9.

Detailed Description Text (16):
With the embodiment of a steering column assembly 1 according to the invention, the locating device 2 comprises an extension section 38 aligned coaxially to its longitudinal axis L. A lock receptacle 39 is shaped to the extension section 38. This lock receptacle 39 is shaped to the extension section 38. This lock receptacle 39 retains a lock cylinder 40 by means of a two-piece retainer 41. The lock cylinder 40 can be turned by means of a key 42 around a rotation axis X, shown in dashes in FIG. 1.

Detailed Description Text (19):
The microswitches 46 constitute the electrical part of a cylinder lock switch 47 (compare FIG. 2) which can be activated by turning the lock cylinder 40 acting as a control. Cams 48 arranged with the lock cylinder 40 on the rotation axis of the lock cylinder 40 in various angular positions are provided to transmit the switching motion to the microswitches 46. Located on these cams 48 are the ends of pins 49 which are guided into the apertures 50 of the lock receptacle 39. In this, the apertures 50 are positioned in such a way that the other end of the respective pin 49 is in contact with the feeler 51 of the respective microswitch 46. Just as is the case with the steering column switches 3, 9, with a cylinder lock switch 47 according to the invention, the principle of separating the mechanical part from the electrical part is thus realized. This allows installation and replacement of the mechanical part (lock cylinder 40 with cams 48 and pins 49) independent from the electrical part (microswitches 46) borne by the support board 12.

Detailed Description Text (21):
At the side of the locating device 2 located opposite the aperture of the lock receptacle 39, coaxially to the rotary axis X of the cylinder lock 40, there is a receptacle 52 for a detection and control unit 53 of a drive-away security device (not shown) or an immobilizer. For example, the detection and control unit 53 excites a transponder borne by the key 42 and depending on the signal received, for starting the vehicle, removes the drive-away lock. The electronic components required to carry out this function are also arranged on the support board 12.

Detailed Description Text (22):
In addition, the support board 12 accommodates a turning angle sensor for detecting the steering angle. Here too, the principle is realized of concentrating all elements required for electrical function on the support board 12, with only the movable mechanical components being spatially separated from them. Also, a torque registering device or a device for transmitting a control signal for an airbag can be provided, with the respective electronic or electrical control device of the said torque registering device or device for transmitting a control signal for an airbag also being positioned on the support board 12. To communicate between the electrical control unit and the functional elements of the vehicle, the support board 12 comprises a data-bus interface 54 by way of which the synchronous or asynchronous control data can be transmitted to the individual functional groups of the vehicle. Coupling with a high-frequency radio remote-control of a vehicle can also take place via the centrally arranged electrical control unit, in that the receiver for the HF remote control is also accommodated on the support board 12. This is advantageous because the region below the steering wheel is preferably accessible for HF radiation from outside.

CLAIMS:

11. A steering column assembly according to claim 10, wherein the control means is formed by at least one cam arranged on a rotational axis of the lock cylinder and that the cam interacts with a switch element arranged on the support board.